

**WHAT IS CLAIMED IS:**

1. A Kalman-Viterbi joint channel equalizer, comprising:
  - a forward filter and a backward filter for receiving an input signal and a predetermined signal and performing filtering to the signals;
  - 5 a Viterbi decoder for correcting errors during a transmission procedure in a blind mode;
  - a training symbol storing block for storing training symbols;
  - a switching block for classifying an output signal of the Viterbi decoder and symbols in accordance with a training mode and a blind mode,
  - 10 and inputting the output signal of the Viterbi decoder and symbols into the backward filter;
  - a Kalman gain calculating block for receiving input signals of the forward filter and the backward filter and calculating a Kalman gain;
  - 15 an error signal calculating block for calculating an error signal by comparing an equalized signal, symbols, and the output signal of the Viterbi decoder with one another; and
  - a tap coefficient updating block for updating a tap coefficient of the filters by using the calculated error signal and the Kalman gain.
2. The Kalman-Viterbi joint channel equalizer according to claim 1,  
20 wherein the Kalman gain calculating block updates the tap coefficient by applying a fast Kalman algorithm in a blind mode.
3. The Kalman-Viterbi joint channel equalizer according to claim 2,  
wherein the Viterbi decoder uses a Viterbi decoding algorithm in a blind

mode.

4. The Kalman-Viterbi joint channel equalizer according to any one of claims 1 to 3, wherein the Viterbi decoder reduces a tracing back length to use the reduced tracing back length in obtaining errors for tap coefficient updating.

5 5. The Kalman-Viterbi joint channel equalizer according to any one of claims 1 to 3, wherein the Viterbi decoder corrects errors by skipping symbols in a predetermined number of symbols to obtain errors for tap coefficient updating.

10 6. The Kalman-Viterbi joint channel equalizer according to any one of claims 1 to 3, wherein a symbol location of a robust stream is previously recognized and is applied to a data duration blind algorithm using the Viterbi decoder when an E-VSB is applied to the Kalman-Viterbi joint channel equalizer.

15 7. A VSB signal receiving system, comprising:

a tuner for receiving an RF signal from an antenna and synchronizing the RF signal with a local oscillation signal to transform the RF signal into an IF signal;

20 an NTSC removing filter for removing an NTSC component from the IF signal to prevent degradation of an HDTV due to the NTSC component;

an equalizer for removing multi-path distortion generated in a transmission channel by equalizing the input signal;

a phase tracer for removing phase noise from the equalized signal;

a trellis decoder for performing trellis decoding with respect to an output signal of the phase tracer and outputting a decoded signal;

5           a data de-interleaver for performing reverse interleaving to the decoded signal;

an RS decoder for performing Reed-Solomon decoding to the output signal of the data de-interleaver so as to generate error-corrected bit streams; and

10           a de-randomizer for providing the output signal of the RS decoder to other elements of the VSB signal receiving system,

15           wherein the equalizer further comprises:

              a forward filter and a backward filter for receiving an input signal and a predetermined signal and performing filtering to the signals;

              a Viterbi decoder for correcting errors during a transmission procedure in a blind mode;

15           a training symbol storing block for storing training symbols;

              a switching block for classifying the output signal of the Viterbi decoder and symbols in accordance with a training mode and a blind mode and inputting the output signal of the Viterbi decoder and symbols into the backward filter;

20           a Kalman gain calculating block for receiving input signals of the forward filter and the backward filter and calculating a Kalman gain;

              an error signal calculating block for calculating an error signal by comparing an equalized signal, symbols, and the output signal of the Viterbi

decoder with one another; and  
a tap coefficient updating block for updating a tap coefficient of the  
filters by using the calculated error signal and the Kalman gain.